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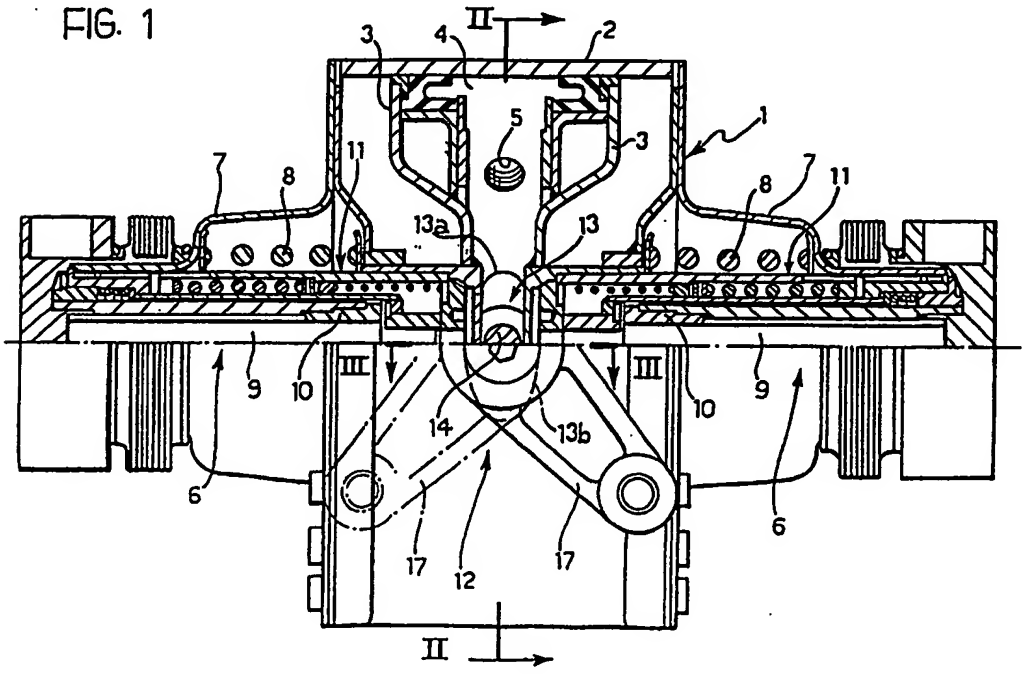
(54) A double pneumatic actuator for railway-vehicle brakes in which play is taken up automatically

(57) A double pneumatic actuator (1) for railway-vehicle brakes has two opposed pistons (3) associated with respective rods (6) which can be advanced in order to simultaneously operate the brake pads of two wheels and with devices (11) for automatically taking up play due to the wear of the brake pads. The actuator (1) has an emergency and parking brake device (12) constituted by a cam (13) interposed between the two pistons (3) and having a double active profile (13a, 13b) which cooperates with two opposed cam-follower surfaces thereof. The cam (13) is carried by a shaft (14) which is rotatable about an axis perpendicular to the direction of advance of the rods (6) between an angular inoperative position and an angular operative position of the cam (13) and is operable by means of an external pivotable lever (17).

FIG. 1



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A double pneumatic actuator for railway-vehicle brakes in which play is taken up automatically.

The present invention relates in general to pneumatic actuators for railway-vehicle brakes.

More particularly, the invention relates to a double pneumatic actuator of the type including a body which is intended to be interposed between the brake pads or blocks of a pair of coaxial wheels, the body defining a cylinder which can be supplied by a compressed air source and in which two opposed pistons are movable, each piston being associated with a respective rod which can be advanced in order to operate the brake pads of the respective wheel, in which each rod includes a unit with a screw and female thread and a device for automatically taking up play due to the wear of the brake pads, and having emergency or parking brake means for advancing the rods even in the absence of compressed air in the cylinder.

In known double actuators of the type defined above, the emergency or parking brake means are generally constituted by mechanisms outside the body which can be operated manually to pull the rods outwardly of the body and consequently operate the brake pads.

These known solutions are generally complex, bulky and difficult to operate.

The object of the invention is to prevent the aforesaid problem by providing a double pneumatic actuator of the type defined above which has simple, effective and easily-operated emergency or parking brake means for

simultaneously advancing both the rods and simultaneously operating the respective brake pads.

According to the invention, this object is achieved by virtue of the fact that the emergency or parking brake means are constituted by a cam interposed within the cylinder between the two pistons and having a double active profile which cooperates with two opposed cam-follower surfaces, one on each piston, the cam being carried by a shaft which is supported by the body for rotation about an axis perpendicular to the direction of advance of the rods between an angular inoperative position and an angular operative position of the cam, the shaft having an end which projects from the body and carries a pivotable external operating lever.

The invention will now be more particularly described, purely by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a schematic, partial longitudinal section of a double pneumatic actuator according to the present invention,

Figure 2 is a vertical section taken on the line II-II of Figure 1, and

Figure 3 is a horizontal section taken on the line III-III of Figure 1.

With reference to the drawings, the double actuator according to the invention includes a body 1 which is intended to be fixed rigidly to the frame of a railway-vehicle bogie between two wheels on the same

axle in order to operate the respective brake pads or blocks simultaneously.

The body 1 includes a cylindrical casing 2 in which two opposed pistons, generally indicated 3, are sealingly slidable and define between them in the casing 2 a thrust chamber 4 which is intended to be connected to a source of compressed air by means of a duct 5.

Each piston 3 is associated with a respective rod, generally indicated 6, which is axially slidable in a respective tubular appendage 7 of the body 1 in order to operate, in conventional manner, a brake caliper, not illustrated, which carries a pair of friction pads for braking the corresponding wheel of the vehicle. The two brake calipers are closed as a result of the admission of compressed air into the thrust chamber 4 and the consequent movement apart of the pistons 3 and their rods 6, and the calipers are opened, as a result of the exhausting of the thrust camber 3, by means of a pair of biasing springs 8 associated with the two rods 6.

Each rod 6 includes, in known manner, a unit with a screw 9 and female thread 10 and an associated device 11 for automatically taking up play due to the wear of the brake pads. The devices 11 for taking up play are wholly conventional and are not therefore described in detail; for the purposes of the present invention, it suffices to explain that each device extends the respective rod 6 automatically as a result of the unscrewing of the screw 9 relative to the female thread 10, in order to take up the play.

An emergency or parking brake device, generally

indicated 12, can be operated from outside the body 1 in order to close the brake calipers of the two wheels in the absence of a compressed-air supply to the actuator. According to the invention, the device 12 is constituted by a single cam 13 disposed within the cylinder 2 and carried by a shaft 14 which extends within the cylinder 2 perpendicular to the line of movement of the pistons 3 and the respective rods 6. As shown in greater detail in Figures 2 and 3, the ends 14a and 14b of the shaft 14 are supported for rotation respectively by a blind sleeve 15 and by a tubular sleeve 16 which are fitted sealingly in diametrally opposed regions of the cylinder 2. The cam 13 is disposed near the end 14a and has two opposite and symmetrical lobed profiles 13a and 13b which cooperate in sliding contact with two opposed cam-follower surfaces 3a on the external walls of the two pistons 3.

The end 14b of the shaft 14 which extends through the tubular sleeve 16 has an end shank 14c which projects from the cylinder 2 and to which a pivotable operating lever 17 is keyed, the lever being operable remotely by a remote control or similar conventional system. The lever 17 can pivot between the inoperative position of the device 12 which is shown in continuous outline in Figure 1 and the operative position which is shown in broken outline in the same drawing. In the first position, the two lobed profiles 13a and 13b do not interfere with the cam-follower surfaces 3a and, in the absence of compressed air in the chamber 4, the pistons 3 and their respective rods 6 are therefore kept in the retracted condition by their biasing springs 8. In the second position, the lobed profiles 13a and 13b keep the two pistons 3 and their respective push rods 6, by means of the cam-follower surfaces 3a, in their

advanced positions for the emergency or parking braking of the wheels of the vehicle associated with the actuator.

CLAIMS

1. A double pneumatic actuator for railway-vehicle brakes, including a body which is intended to be interposed between the brake pads of a pair of coaxial wheels, the body defining a cylinder which can be supplied by a compressed-air source and in which two opposed pistons are movable, each piston being associated with a respective rod which can be advanced in order to operate the brake pads of the respective wheel, in which each rod includes a unit with a screw and female thread and a device for automatically taking up play due to the wear of the brake pads, and having emergency or parking brake means for advancing the rods even in the absence of compressed air in the cylinder, wherein the emergency or parking brake means are constituted by a cam interposed within the cylinder between the two pistons and having a double active profile which cooperates with two opposed cam-follower surfaces, one on each piston, the cam being carried by a shaft which is supported by the body for rotation about an axis perpendicular to the direction of advance of the rods between angular inoperative position and an angular operative position of the cam, the shaft having an end which projects from the body and carries a pivotable external operating lever.

2. A double pneumatic actuator for railway-vehicle brakes, substantially as herein described with reference to, and as shown in, the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number

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Relevant Technical fields

(i) UK Cl (Edition K) F2E (EAB,EBE,EBF,EEB,EEC)

(ii) Int Cl (Edition 5) F16D, B61H

Search Examiner

P T SQUIRE

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Date of Search

17.12.91

Documents considered relevant following a search in respect of claims 1-2

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A	GB 515225 (BENDIX) see page 3 lines 66-70 and 78-81	
A	GB 487802 (AUTOMOTIVE PRODUCTS) see page 3 lines 64-83	

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

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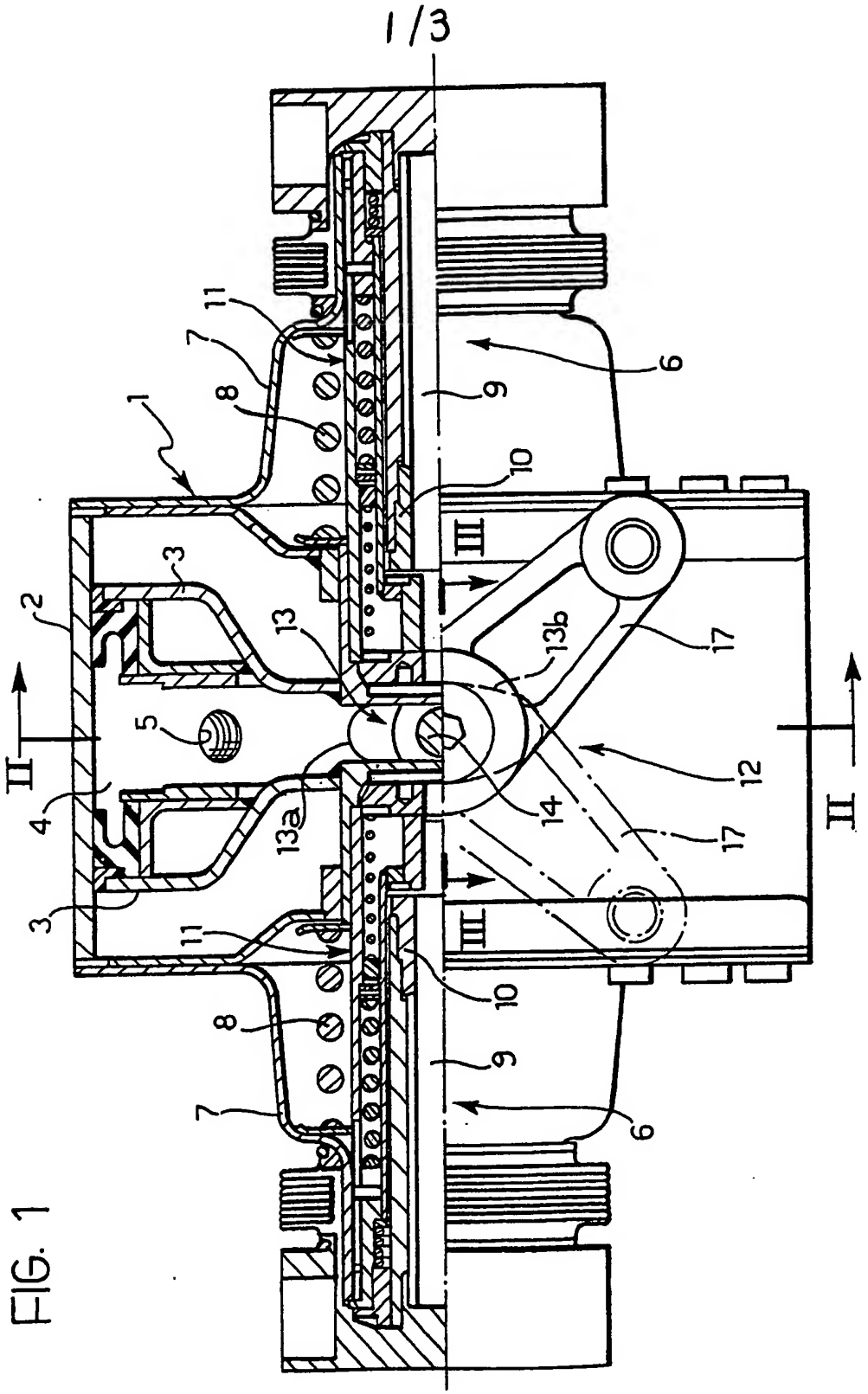

FIG. 1

FIG. 2

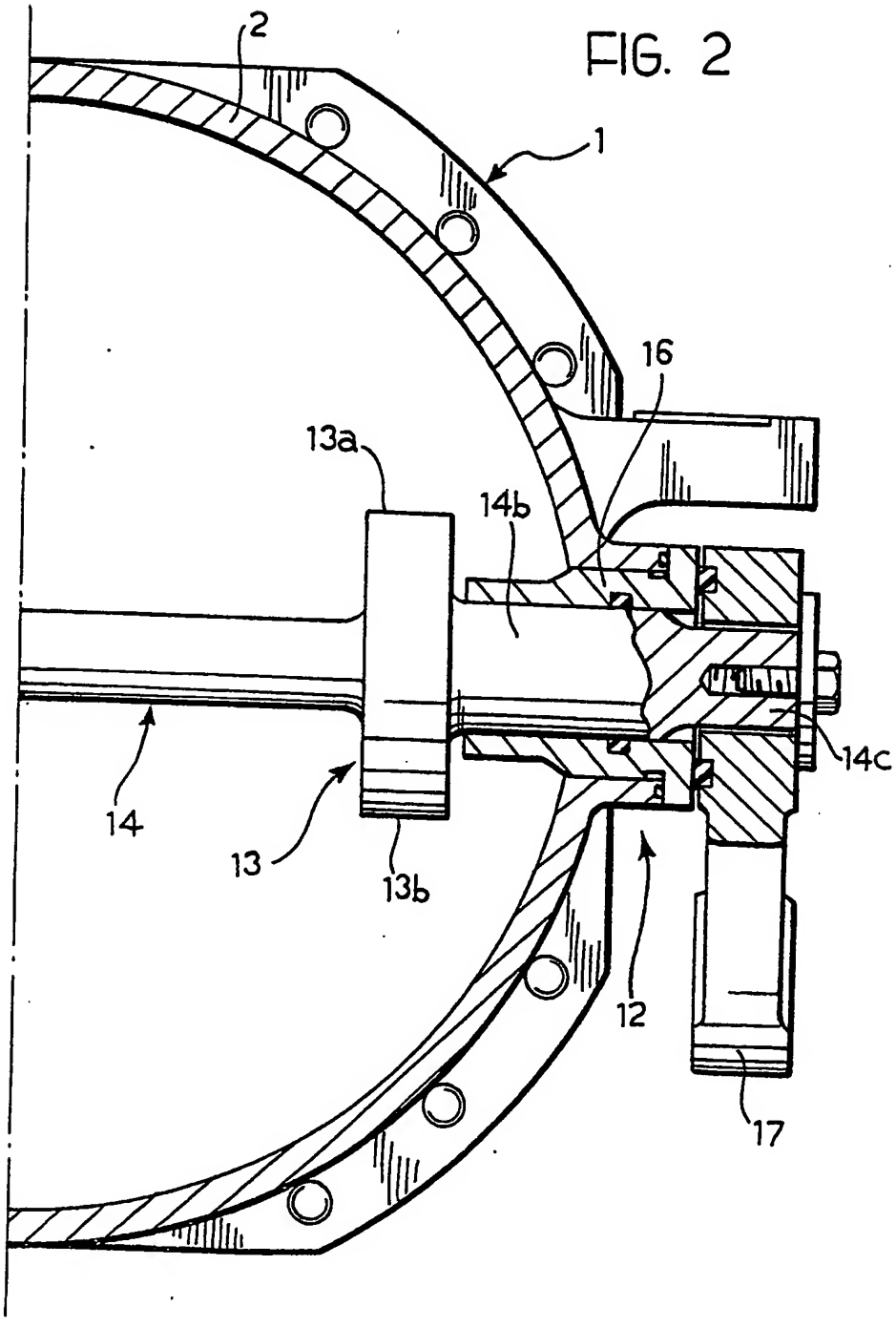

FIG. 3